AMERICAN ARACHNOLOGICAL SOCIETY

American Arachnology

Newsletter of the American Arachnological Society

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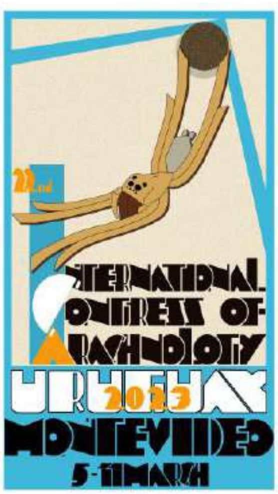
2023 International Congress of Arachnology, Uruguay



The 22nd International Congress of Arachnology will be held in Intendencia de Montevideo, Montevideo, Uruguay from 5 – 11 March 2023. To register, go to https://arachnology.org/22nd-ica-2023.html.

There will be four keynote speakers: Maydianne Andrade, Maria Elena De Lima Perez Garcia, Gustavo Hormiga, and Abel Pérez González. There will also be five symposia including a tribute to Norman Platnick; a symposium focused on women in arachnology; another focused on the arachnid order Solifugae; a symposium on social spiders; and one on spiders in agroecosystems. In addition, there will be two pre-congress workshops: Updating the Guidelines for Arachnological Papers in Zootaxa and Recognizing and Interrupting Unconscious Bias in STEM.

Registration costs for attendees range from $280 - $390 depending on your status and whether you register early. Travel grants are available. To apply for grants, candidates should send an email to 22ica.uy@gmail.com.

The hosts are also organizing both a mid-congress excursion and two different post-congress excursions. Don't miss this opportunity to network with international arachnologists, celebrate women in arachnology, and explore Uruguay!

2023 American Arachnological Society meeting, Ithaca, New York

The annual meeting of the American Arachnological Society will be held at Cornell University in Ithaca, New York from 25 – 29 June 2023 hosted by Drs. Linda Rayor and Matthias Foellmer. On campus housing will be available. Scenic Ithaca, New York is located at the southern end of Cayuga Lake in Central New York in the Finger Lakes region. Cayuga Lake is 40 miles long and roughly one mile wide. Ithaca truly is "Gorges" as there are two gorges on campus and 150 waterfalls within 10 miles. Local parks, wineries, craft breweries also add to the regional flavor.

Ithaca is a 4.5 hour drive from New York City and is accessible via Ithaca Tompkins International Airport where shuttles are available to take attendees to campus.

The meeting hosts need volunteers to help plan this meeting. If you are able to help organize the scientific program, symposia, pre-meeting professional development and outreach workshops, or mentoring events for new attendees, please contact the organizers at aas2023@americanarachnology.org. Likewise, if you know of potential donors who can support travel funds or sponsor other meeting-related events, please send this information to the organizers at the same email address.

Grant Deadline Reminders

The AAS offers several grants to support student and early career researchers. Information about these grant opportunities can be found at: https://www.americanarachnology.org/society/grants/research-grants/. The deadline for all grants is February 15, 2023.

Publication Discount and Special Issue Announcements

Princeton University Press is offering 30% publication discounts for AAS members through the end of 2022. This includes a 30% discount for Sarah Rose's new photographic field guide, *Spiders of North America*! The discount code is ARAC30.

Matjaz Kuntner also wanted to announce the publication of the special issue, "Phylogenomic, Biogeographic, and Evolutionary Research Trends in Arachnology." Articles in this special issue are open access: https://www.mdpi.com/journal/diversity/special_issues/Evo_Arachnology

A new journal focused on arachnid research has just launched: Frontiers in Arachnid Science. Research topics for this new journal include "Arachnid Diversity, Conservation and Biogeography," edited by Ingi Agnarsson; "Arachnid Ecology and Behavior," edited by Peter Schausberger; "Arachnid Microbiota and Diseases," edited by Jason Bond. Visit the journal site for more information and to submit an article.

Request for *Salticus* Species

Frank Pascoe (FPascoe@stfrancis.edu) is currently collaborating on a taxonomic revision of the salticid genus *Salticus* with Tim Manolis. They would greatly appreciate any *Salticus* specimens (except *S. scenicus*), either alive or preserved. Any photos or videos would also be helpful. If you have specimens or are interested in helping collect, please contact Frank directly.

In Search of the Ant-Mimicking salticid *Myrmarachne formicaria* in its native range

by Jennifer L. Apple, SUNY Geneseo, Geneseo, New York

Myrmarachne formicaria is a striking little Eurasian spider. This salticid might go unnoticed to many as its movement and body shape suggest it is an ant. On closer inspection, one will see it wave its front pair of legs, appearing like antennae (video showing its ant-like movements: https://youtu.be/Lzq_95td1-w). It typically has a bicolored cephalothorax and abdomen, with patches of chestnut brown and dark brown or black, but its coloration can be quite variable (Fig. 1). The species is sexually dimorphic; the males are particularly impressive for their enlarged chelicerae which jut out in front of them. Males employ these chelicerae in fascinating male-male displays: (https://youtu.be/QywsXKWrioM). In 2019, it was designated European Spider of the Year (European Society of Arachnology, 2019)!

Figure 1. Myrmarachne formicaria. Upper: male. Lower: female.

Myrmarachne formicaria is a newcomer to North America; the first report of this spider was in Ohio in 2001 by Bradley et al. (2006). Later it was noted in the Buffalo, New York, area (Gall & Edwards, 2016), and more recently in Pennsylvania (Barringer, 2017). It is also widely reported in the Toronto area, first noted in 2015 (Wizen, 2017). It has captured the attention of many citizen scientists contributing observations to the iNaturalist web platform; these data provide a good picture of its spread in northeast North America and in Canada (Fig. 2).

I have been studying *M. formicaria* since 2017, trying to document its habits in natural areas of western New York – its habitat preferences, phenology, and behavior. I first encountered it through my studies of raids of kidnapper ants *Formica subintegra* on their host species *F. glacialis*; sometimes I would see this spider wandering around the ant nests I was observing and found that they built their silken shelters on the vinyl pin flags I would use to mark the ant colonies. Most of the original reports of this species were from peridomestic settings – inside houses or other structures, around buildings, and other sites associated with human activities. On a collecting trip to find specimens from across the invaded range for genetic analysis, I readily found them climbing walls of storage sheds, near buildings of field stations and nature centers, on lawn furniture, and on other human-related debris. My own research at field sites in and around Geneseo, New York, shows that they can also be abundant in more natural, non-anthropogenic habitats, like young forests, forest edges, old fields, and rocky lake shores, using leaves of low vegetation or the leaf litter as substrates for their silken shelters.

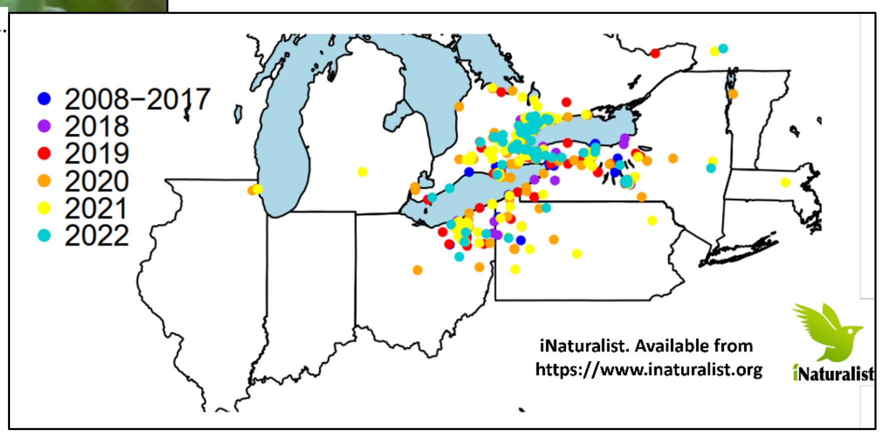


Figure 2. Map of research-grade observations of M. formicaria from iNaturalist as of 28 August 2022. Data acquired through 'rinat' R package.

Naturally I have become curious about how *M. formicaria*'s habits in North America compare to those in its native range. Does it use similar habitats in Eurasia? Is it associated with particular ant species? Does it also show an affinity for sites associated with human activity in Europe as we see here in North America? Little has been published about the habits of *M. formicaria* in its in native range: generally a few sentences here and there in papers surveying arachnid diversity in various localities, although one more extensive study suggests it may be mimicking the ant *Formica rufibarbis*, at least in the Czech Republic (Pekár & Jiroš, 2011).

To obtain specimens for further population genetic analyses and learn more about the ecology of *M. formicaria* in its native range, I set out on an ant-mimicking spider search mission in Europe this summer. Species occurrence data from the Global Biodiversity Information Facility (GBIF) suggested we would find peak abundances in May or June, but unfortunately visiting that early in the summer wasn't possible. With my husband, Dr. Jeff Over, a geologist but also avid ant-mimicking spider wrangler who bravely did all the driving, I visited >90 localities from 15 July to 15 August 2022 in France, Germany, Belgium, Spain, Italy, Austria, and the Czech Republic. Sites were chosen with known occurrences of this species based on GBIF data, iNaturalist observations, other regional databases, or identified from the road as having favorable habitat (Fig. 3).

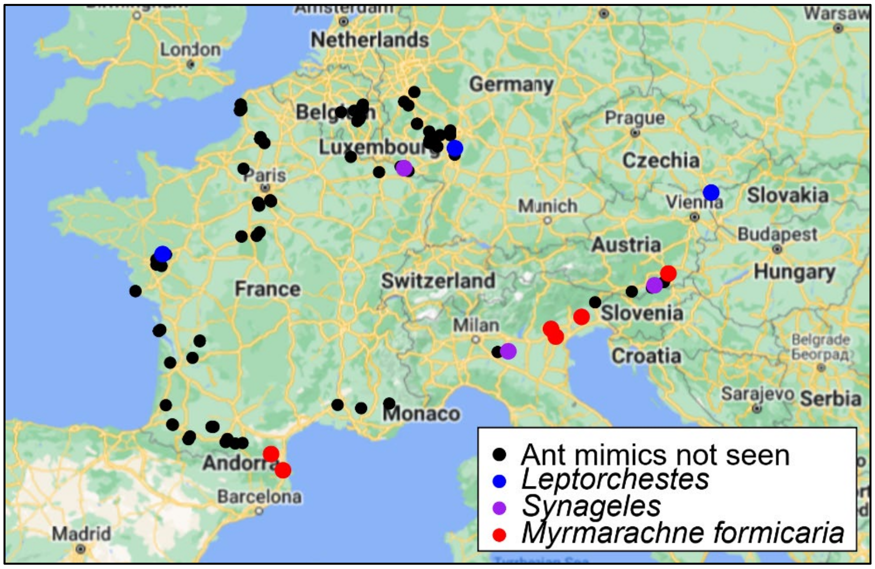


Figure 3. Localities visited in summer 2022. Sites where ant-mimicking spiders were observed indicated by the colored points. The identity of the small specimen collected in Austria still requires confirmation, but *M. formicaria* was confirmed in 5 of the sites visited. Map prepared using R package 'RgoogleMaps.'

After visiting >50 sites in Germany, Belgium, and France, our first success was in Spain, at a locality posted on iNaturalist by spider enthusiast Jofre Espigulé-Pons. Jofre even joined us for the search. We observed more individuals here (10) than at any subsequent locality. The next day we visited a site near Cassagnes, France. The actual locality based on GBIF data seemed far too dry at this time of year, but along a river nearby we found three juveniles among the leaves and litter of an iris plant. We moved on to Italy where we found *M. formicaria* at three more sites: in a patch of brambles along the Brenta River in Santa Maria di Non (along with some *Synageles*), in some pond vegetation along a trail near Bassano del Grappa (our one adult finding!), and in shrubs at a riverside park in Pordenone. One more site in Austria may have produced a very small juvenile, but its identification still requires confirmation. Only 16 individuals were observed in 5(-6) locations. All were very small juveniles, except for the single adult male (Fig. 4). While looking for *M. formicaria,* we encountered other ant-mimicking salticids *Leptorchestes* and *Synageles*, sometimes in the same sites as *M. formicaria.*

Figure 4. Juvenile *M. formicaria* about 3 mm long collected in Spain.

Curiously, all the localities where we found *M. formicaria* were near water (Fig. 5). While this habitat characteristic has been mentioned in several papers and suggested in communications with spider observers, proximity to water is not a habitat feature noted among most of the natural populations of *M. formicaria* I have observed in New York. The type of vegetation characterizing *M. formicaria* localities where we did find the spider was not unlike that in New York – broadleaf shrubs and herbaceous plants with leaves 0.5-1 m above the ground. It was also surprising that we never observed the spider in any synanthropic settings in Europe, despite their abundance in such sites in North America.

I found it somewhat remarkable that a species that is becoming increasingly common in North America was so hard to find in its native range. It is possible that the timing of our survey was not optimal for locating *M. formicaria* in great numbers. And though we did visit countries with high numbers of relatively recent observations (particularly France), we may have missed promising areas that are not reported on easily located databases. Upon returning to the United States in late August, I surveyed eight of my sampling grids in a young forest, and in one day I observed 103 individuals, including 60 adults. We also routinely observed adults and subadults on structures around our house at that time. Are the seasonal patterns in the native and invaded range really so different? Are *M. formicaria* exploiting different habitat niches in North America than in Europe? Is *M. formicaria* escaping some potent natural enemy or dominant competitors in its new range allowing it to achieve much higher abundances?

To begin to answer these questions, I would appreciate any information anyone might be able to share about their experiences with *M. formicaria,* especially areas where it may be locally common in its native range of Europe. Any habitat information will be helpful and can inform future search efforts. Ultimately, I seek specimens for genetic analyses that might provide more insight into the history of this species' introduction to North America. Preliminary analyses of North American samples from New York, Ohio, and Pennsylvania suggest very little genetic variation, though I lacked any Canada specimens in my sampling. Also, more information about habitat associations within the invaded range here in North America would be useful as well. iNaturalist postings are a valuable source of information but rarely provide enough detail to learn about a species' preferred natural habitats; I suspect many of these observations continue to be from peridomestic settings.

Figure 5. European sites where *M. formicaria* was found, clockwise from top left: (a) Font Pudosa in Sant Climent Sescebes, Spain; pictured are Jofre Espigulé-Pons and Jenny Apple; (b) Jeff Over next to an iris by the Agly River in France where juveniles were found; (c) brambles in this site by the Brenta River in Santa Maria di Non, Italy, yielded one juvenile *M. formicaria* and several *Synageles*; (d) beating pondside vegetation along a trail near Bassano del Grappa, Italy, produced the only adult observed on our trip.

If you have any information to share, please contact me at applej@geneseo.edu. Thank you!

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Ants, *Novomessor albisetosus* (Mayr) Prevent Nest Mates from Dying

by Norman Horner, Emeritus Professor of Biology, Midwestern State University,
norman.horner@msutexas.edu

Introduction

For the past 20 plus years I have been using pitfall traps containing propylene glycol (antifreeze) to capture ground dwelling invertebrates. This started when Greg Broussard (a master's student), was conducting a survey of cursorial spiders in the Chihuahuan Desert of West Texas on land owned by Midwestern State University known as the Dalquest Desert Research Station (Broussard and Horner 2006). He found seven spiders that evidently were new species and we could not identify to any known family. Specimens were sent to Norman Platnick for identification. The specimens were new to Platnick and in 2005 he organized a collecting trip to the site. Only one was found on that trip and it was collected in a previously set trap. After Platnick retired, he turned the project over to Martín Ramírez and eventually, *Myrmecicultor chihuahuensis* was described by Ramírez, Grismado, and Ubick and placed in a new family, Myrmecicultoridae (Ramírez et al., 2019).

In 2008, Dr. David Lightfoot from the Museum of Southwestern Biology, University of New Mexico observed the spiders moving on a nest of *Pogonomyrmex rugosus* in the northern Chihuahuan Desert of Mexico. Lightfoot took the spiders back to Sandra Brantley for identification. She sent them to Dr. Platnick and he told her this was the spider that had been found at the DDRS. After Lightfoot's association with the harvester ants, our collection efforts switched to trap locations within a meter of harvester ant nest entrances. The average number of the new spider captured per season with random traps was five spiders per year and after setting the traps near nests as many as 41 were captured in one season. To date *M. chihuahuensis* has been collected near nests of three species of harvester ants, *Pogonomyrmex rugosus* (Emery), *Novomessor albisetosus* (Mayr) and *N. cockerelli* (André). The vast majority of the spiders have been collected near *N. albisetosus* entrances in an intermittent stream bed or adjacent to it known as the South Fork of Alamo de Cesario Creek. *Pogonomyrmex rugosus* and *N. cockerelli* nests were at least 152 m (500ft) above the *N. albisetosus* habitat.

Observations of *Novomessor albisetosus*

Novomessor albisetosus, commonly known as the desert harvester ant, is found in the southwestern part of the United States (Texas, New Mexico, and Arizona). It also ranges into the northern Chihuahuan desert of Mexico. Each year since 2009, I have set pitfall traps between mid-May thru October, or about 165 days per year near harvester ant near nest entrances. This was approximately 1,650 trap nights in a season. Traps were set, then a flat stone was placed over the trap to prevent an animal from stepping into the trap and to allow invertebrates to go under the rock and be captured (Fig. 1).

Figure 1. Normal trap set with open space between flat stone and ground surface.

In May of 2022 ten traps were set near *N. albisetosus* nests. When checking the next month's collection (June, 2022), for some unknown reason, four of the ten traps were plugged to prevent entrance into the traps. The space between the stone and the ground surface was sealed with small gravel. This was obviously done by the ants and it appears this was done to prevent any more nest members from falling into the pitfall traps (Fig. 2). Fig. 3 has the stone removed and the small stones are visible stacked up next to the trap. This activity reduced the take of the trap and there was a large number of small pieces of gravel that had been pushed into the cup. The majority of trap contents were dead ants and gravel.

When the traps were reset, the small gravel was removed and the clearance below the stone was made. However, when running the traps for the July collection, two of the previously sealed traps were once again sealed.

Figure 2. Trap entrance sealed with small gravel by *N. albisetosus* workers.

Figure 3. Stone removed showing the small gravel used to seal the opening.

Purpose and Reason for Sealing Pitfall Trap

My first contact was with Dr. Paula Cushing, Denver Museum of Nature and Science, who has worked with spiders and ants for most of her career. She has also been involved in the *Myrmecicultor chihuahuensis* project since its inception. She told me she had never heard of this behavior. I decided to contact Dr. Robert Johnson, Arizona State University. He is the myrmecologist who identified the ants for the 2019 publication of the new spider. He stated he had never heard of this behavior in any of the harvester ants.

This observation of plugging has opened a lot of questions. Why did the workers do this other than to protect the colony from the loss of sister nest mates? How did they communicate the problem and develop the work force to get it completed? This had to be by some type of chemical signal.

A cursory review of the ant literature did not reveal information about this behavior. Dr. E. O. Wilson and colleagues published a paper (Wilson et al., 1958) showing that oleic acid initiated necrophoric behavior in *Pogonomyrmex badius* (Latreille). They discovered that dead ants that were allowed to decompose in open air released oleic acid. Testing with oleic acid demonstrated that it was the substance which caused the ants to behave as they did toward dead ants. Is it possible that the dead ants in the propylene glycol are releasing oleic acid and they are trying to seal off the odor? This is doubtful because the propylene glycol would probably prevent the oleic from becoming airborne.

Langin (2014) published a review article and reported that if ant colonies of the European fire ant or red ant (*Myrmica rubra* L.) are able to remove their dead ants from the colony, it will remain much more healthy than those colonies that were not allowed to remove them. She states that if the dead were left in the colony, the rate of colony death was more than double than when the dead were removed. There is little doubt that the sealing of the trap is for the health of the colony. The first thing that comes to mind is the sealing takes place to prevent the loss of nest mates. Certainly, it is a guess. Why did four colonies seal off the traps out of 10, when most years none were sealed? If anyone has any ideas about what is going on, I would be happy to hear from you.

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Interview with Norman Horner

Norm Horner examining a *M. chihuahuensis* in the field in Texas.

While at Dalquest Desert Research Station doing research on biology of *Myrmecicultor chihuahuensis* in October 2022, Paula Cushing interviewed Norm Horner about his past associations and research in arachnology. Norm's dad was a sharecropper in Texas. His mom had a 5th grade education and his dad a 6th grade education. They recognized Norm's talents and encouraged him to go to college. His dad sold some cattle to enable Norm to go to college. When Norm started college, he worked in the cafeteria. He worked 20 hours a week and made enough money to pay his tuition and his room and board. And he still had about $10 a week for spending money. Norm got a job in Dallas with Wesco Materials, owned by Clint Murchison, the owner of the Dallas Cowboys.

Norm was part of the AAS since its inception and knew Vince Roth, Willis Gertsch, Norman Platnick, Martin Muma, Don Lowrie, Bea Vogel and others. Norm was the first treasurer of the AAS – Gail Stratton took over after him.

Norm told a story about being at a meeting in Florida where Norm was giving a paper on mud dauber nests and the biology of wasps in the genera *Sceliphron, Chalybion*, etc. and was talking to Will Whitcomb. Norm said something about spiders emerging from eggsac in the 2nd instar. Will Whitcomb argued with Norm and said they emerge in their first instar. Norm said, no, they molt inside the eggsac and then emerge. So Whitcomb led them over to B.J. Kaston and Will asked B.J. to set Norm straight. B.J.'s answer was, "well, it depends on how you define instar."

Norm told a story about an Entomological Society meeting – the ESA meeting when there was a big push to start a separate society focused on arachnids. Vince Roth was there as was Willis Gertsch. " I was just a young kid, just sitting there listening. And Vince said, 'Come on up to my room. I want to show you something.' I go up there and he has a live tarantula in a coffee can. Takes it out. And we talk about 'em."

Paula: "Were you an undergraduate at this time? A professor?"

Norm: "No, I had a master's degree. The year after I finished the PhD….I started….I think it was 1971 when the society was first formed and we met in Silver City, New Mexico. That's where it started and I remember everyone was wondering where Vince [Roth] was. And, of course in Arizona, they don't observe daylight savings time so he showed up an hour late."

Paula: "Where did you get your master's and what did you do your master's on?"

Norm: "I did my master's on the brown recluse. The life history of the brown recluse. And that was, at that time, North Texas State University."

Paula: "Who was your advisor?"

Norm: "A guy from Oklahoma State who was an entomologist and he actually…I think his main work was with beetles. But after he got to North Texas, he switched over to stone flies and he became a big authority on stone flies."

Paula: "What got you interested in working on brown recluse?"

Norm: "It was crazy. I was working on a master's in education. I was going to be a high school teacher and he needed, Dr. Stewart, I worked under him – he needed someone to feed his brown recluse."

Paula: "That he kept for what reasons?"

Norm: "He was thinking about doing a life history study on them. So I said, sure, I'd love to do it. And I started giving him some ideas about what I thought we ought to do and he said, 'You gotta get your master's in biology and let this be your thesis project.' It required me to take some courses in organic chemistry, which I did. And it was probably the smartest thing I did because it moved me a step above the high school level teaching. And, of course, I was married and about that time we had our first daughter. "And so when I finished the master's, there was a guy at Oklahoma State who wanted me to go up there and work on a spider project with him. And it was [on] *Metaphidippus* (at that time) *galathea*. Very common in grain sorghum. So I said, 'Yes, I'll do it.' But I'm broke right now and I really need to work. So I took a couple year hiatus and worked at Midwestern [State University] as an instructor. I liked everything and got to be friends with [the mammologist at MSU, Walter] Dalquest. And I got a leave of absence and went to Oklahoma State. Finished the PhD on the life history of *Metaphidippus galathea*.

"It was about the time that biological control was really beginning to take off. And, basically the department was split into two groups. You had those who were the dusters and wanted to spray everything and you had those who were looking for other ways of controlling [pests]. It all settled out and we ended up with Integrated Pest Management, which is obviously the way to go. But I learned a lot of things about how the pests overwinter. If you can solve where they're overwintering, then you can get rid of a lot of pests."

Paula: "So this was at Oklahoma State and they had an entomology department? And you had to take those classes in Ag and pest management?"

Norm: "Yeah, yeah. I don't remember what the number of hours that I took [classes] but it was a busy time."

Paula: "And then you came back to Midwestern?"

Norm: "Yep, and I came back to Midwestern."

Paula: "So how did you find out about the American Arachnological Society?"

Norm: "I stayed in correspondence with someone from the [organizational] meeting in Silver City. Whoever was in charge of that meeting created a mailing list and that's how we stayed in touch."

Paula: "How did you find out about that?"

Norm: "I was a member of the Entomological Society."

Paula: "So because of your interest and your projects, you knew that there was a break-off group that met and that was Vince Roth and Willis Gertsch and…"

Norm: "Bea Vogel."

Paula: "Yep, Bea Vogel was the first President [of the AAS]."

Norm: "Yes, she was quite involved in that. I don't know….. It's just amazing how things have evolved [with the Society]. And right after the Society [AAS] got going, it was kind of floundering a little bit. Had problems getting the journal published. Oscar Francke out at Texas Tech. My student, James Cokendolpher, who was out there with Francke, they kind of put everything together and held it together. It [JoA] went through Allen Press printing the journals. Mel Thompson, out in California…basically we picked up what was started in California. Mel Thompson was treasurer out there. I was Treasurer for the American Arachnological Society, Herb Levi was President back at that time. I can't remember whether he followed Bea or not….

"James Cokendolpher was working under Oscar at Texas Tech and James had been my master's student. He did his master's project on crab spiders – philodromids. The publication that resulted had James Cokendolpher's name, mine and Dan Jennings. I knew that Dan Jennings was a good crab spider taxonomist so I contacted him to help with Cokendolpher's work. James and I ended up describing the female of *Xysticus robinsoni*."

Norm: "Anyway, I was treasurer when Herb was President. I don't know how many years I stayed as Treasurer – probably 10 or 12. And then Gail Stratton. They decided to split the society into two groups; the eastern and the western branch. And they were meeting at different times and as a result of that, you actually had people who would make both meetings. I don't know how many years that lasted. Probably about four. And then they said, nah, let's put it together. I remember, I had a western branch meeting there at Midwestern. I remember Norman Platnick coming to that meeting. We had some land right there in the city and we went out at night looking for spiders. And Platnick had never seen a scorpion glow, fluoresce. He was so impressed with that.

"I know that meeting was in 1979 because that's the year the tornado hit Wichita Falls and it destroyed a fourth of the city. Forty some odd people were killed in it. That happened in April and we had the meeting in June. So it was pretty chaotic."

Paula: "So do you have any good stories about some of the old arachnologists like Gertsch or Kaston or Roth or Lowrie?"

Norm: "Well, Lowrie….his big interest was the effects of radiation at Los Alamos. He was interested in studying that and what it did to the spider population. That's what I remember most about him.

"Vince Roth, you know, he was just a great guy. He made friends with everyone. And after he and Barbara got married…. Barbara was kind of an independent gal and she did what she wanted to. We were in…I can't remember…I guess we were in Seattle. I can't remember what meeting that would be. She got lost and she was completely gone all night and Vince and everyone was looking for her, trying to find her. They found her the next day. She was fine. She just got lost. They had twins. And the cancer got Vince shortly after the twins were born. I don't know how old they were…probably two or three.

"I saw Barbara at the International meeting that you had there in Denver [Golden]. She came to that.

"Vince told a story about once when he had gone to Martin Muma's house. Vince knew Martin would be smoking. So Vince walked into Martin's house with a smoke pot and was swinging it when he went to visit."

The genus Drassyllus in Kansas

by Hank Guarisco

Introduction

The ground spider genus *Drassyllus* (Araneae, Gnaphosidae) is one of the most speciose genera in the family Gnaphosidae. There are approximately 62 species currently known from Canada to southern Mexico (Platnick & Horner, 2007; Platnick & Shadab, 1982). A list of the number of *Drassyllus* species in surrounding states is provided in Table 1.

Table 1. Number of *Drassyllus* Species per State or Province

State/Location	Number of Species	Reference

Arid Southwest	24	Richman et al., 2022
Canada	16	Platnick & Dondale, 1992
Canadian Prairie Provinces	7	Carcamo et al., 2014
Great Lakes States	14	Sierwald et al., 2005
Arkansas	17	Robison et al., 2021
Maine	7	Jennings & Donahue, 2020
Missouri	15	Stirnaman et al., 1998
South Carolina	14	Gaddy & Morse, 1985
Texas	22	Dean, 2016
Kansas	16	this publication

The central location and diverse ecoregions of the state of Kansas provide habitats for a total of 16 species of *Drassyllus*. The first annotated list of the ground spider family Gnaphosidae in Kansas included 11 species of *Drassyllus* (Guarisco & Kinman, 1990). *Drassylus mumai* was first reported in Kansas from pitfall traps near prairie dog towns on the Cimarron National Grasslands in Morton County (Guarisco et al., 2004). A more recent checklist added 2 more species, bringing the total to 14 (Guarisco, 2007). The discovery of *D. lamprus* in dead yucca plants in upland areas of the Cimarron National Grasslands added one more species to the checklist (Guarisco, 2019). Based upon more recent collections by Glenn Salsbury, this publication documents yet another new state record, *D. frigidus*, in the southeastern corner of the state.

Distribution of *Drassyllus* in Kansas

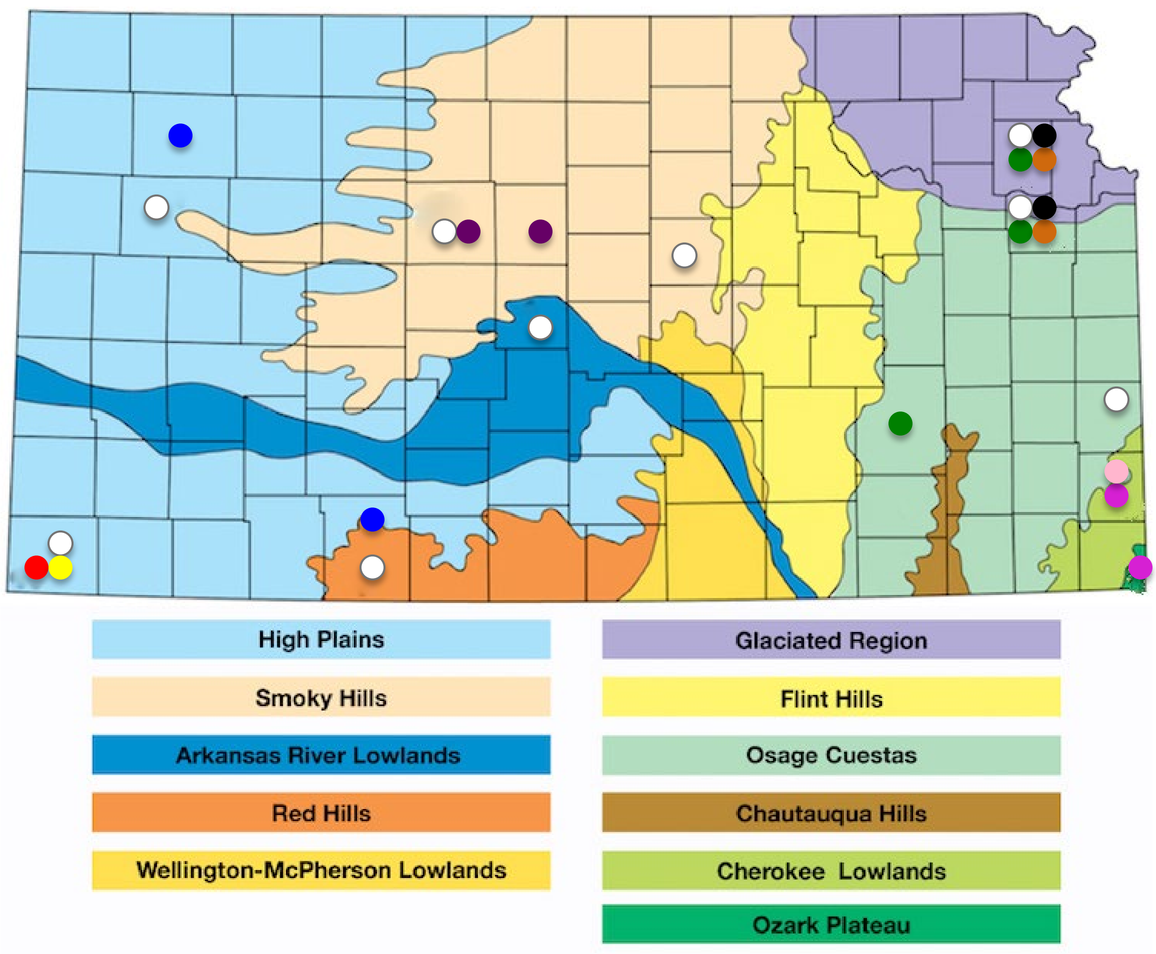
Although much more collecting is required to accurately determine the range of each of these species within the state, the records that have already been accumulated do shed some light upon their distributions (Table 2). For example, *D. mumai* is a southwestern species living in northern Mexico, Texas, Arizona, New Mexico, and Colorado (Platnick & Shadab, 1982). Muma (1980) reported it from pinyon pine-juniper forests in New Mexico. The only known occurrences in Kansas are from the Cimarron National Grasslands in the extreme southwestern corner of the state. This unique region supports a shortgrass prairie as well as a sandsage plant community with many drought-tolerant species at the extreme northeastern edge of their ranges (Freeman, 1989). This location is also the eastern range limit of *D. lamprus*, a species found throughout the western United States (Platnick & Shadab, 1982).

Table 2. Distribution of *Drassyllus* in the United States & Kansas

Species	**Distribution in US**	**Distribution in KS**	**Edge of Range**
aprilinus	eastern	east	W
covensis	southeastern	southeast	NW
creolus	eastern	east	W
depressus	widespread	widespread	(not at edge)
dixinus	southeastern	northeast	NW
dromeus	widespread	widespread	(not at edge)
frigidus	eastern	southeast	W
gynosaphes	central	widespread	NW
lamprus	western	southwest	E
lepidus	southern	widespread	N
mumai	southwestern	southwest	NE
nannellus	northern	widespread	S
notonus	west-southwestern	western	N
novus	eastern	east	W
orgilus	southcentral	western	N
texamans	southeastern southcentral	widespread	NW

Two species of *Drassyllus* appear to be restricted to the southeastern part of the state. *D. frigidus* occurs in the Cherokee Lowlands of Crawford County, while *D. covensis* was found in both the Cherokee Lowlands and the Ozark Plateau in Crawford and Cherokee Counties, respectively. By examining the US distributions of *Drassyllus* species present in Kansas, it is evident that 14 of the 16 species are at the edge of their ranges in the state (Table 2). The exceptions are *D. depressus* and *D. dromeus*.

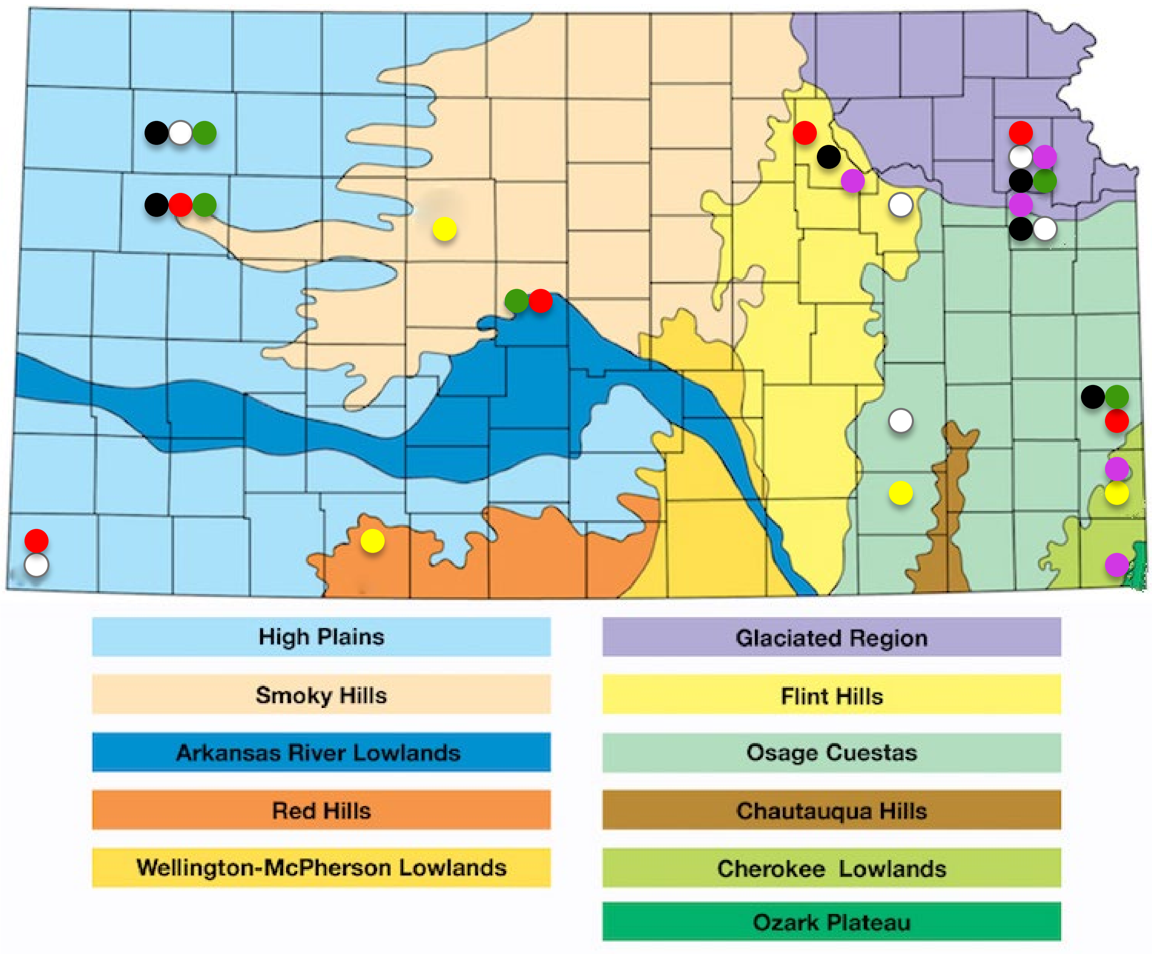
Kansas Physiographic Map A



Drassyllus Checklist with Kansas County Records

● (magenta)	covensis: Cherokee, Crawford
● (green)	creolus: Douglas, Greenwood, Jefferson
● (orange)	dixinus: Douglas, Jefferson
● (pink)	frigidus: Crawford
● (yellow)	lamprus: Morton
○	lepidus: Barton, Bourbon, Clark, Douglas, Ellis, Jefferson, Logan, Morton, Saline
● (red)	mumai: Morton
● (blue)	notonus: Clark, Thomas
● (black)	novus: Douglas, Jefferson
● (purple)	orgilus: Ellis, Russell

Kansas Physiographic Map B



Drassyllus Checklist With Kansas County Records

● (purple)	aprilinus: Cherokee, Crawford, Douglas, Jefferson, Riley
● (green)	depressus: Barton, Bourbon, Jefferson, Logan, Thomas
● (yellow)	dromeus: Clark, Crawford, Elk, Ellis
● (black)	gynosaphes: Bourbon, Douglas, Jefferson, Logan, Riley, Thomas
○ (white)	nannellus: Douglas, Greenwood, Jefferson, Morton, Thomas, Wabaunsee
● (red)	texamans: Barton, Bourbon, Jefferson, Logan, Morton, Riley

Variables Influencing Species Distribution

Ecological works concerning the distribution and abundance of plants and animals consider a wide diversity of biotic and abiotic factors. A classical text by Andrewartha & Birch (1954) considers temperature and moisture to be major variables affecting the distribution of many insects. These two conditions can have both direct and indirect effects. Winter mortality due to extremely low temperatures can eliminate some spider populations and prevent them from living in more northerly latitudes. Rainfall, as well as underlying soil thickness and type, can determine the plant community present at a particular location. For example, the western extent of the Eastern Deciduous Forest is found in the eastern quarter of Kansas. The thin soils of the Flint Hills support tallgrass prairies, but not forests. As we travel westward, the tallgrass gives way to mixed prairies, then the High Plains shortgrass steppes dominated by buffalo grass. Sandsage communities are found on sandy soils. Forest corridors extend along water courses across the plains. These distinct plant associations provide unique habitats suited to diverse species of animals.

The Cimarron National Grasslands, which is a semi-arid region receiving 16 inches of rain per year, clearly illustrates this principle. A large gallery forest of cottonwood trees that follows the dry riverbed of the Cimarron River bisects the area. The extensive sand dunes to the south support a sandsage plant community. The shortgrass prairie north of the river contains many drought-tolerant plants, including several kinds of cacti. Each of these diverse habitats supports a very distinct spider fauna (Guarisco, 2019).

Population biologists concern themselves with a species' innate rate of increase and mortality factors that regulate the population (MacArthur & Connell, 1966). Some small spiders with phylogenetic constraints may only produce a few eggs per egg sac, but increase their overall fecundity by producing 10 or more egg sacs throughout the active season. Others, such as the fishing spider, *Dolomedes tenebrosus*, produce one or possibly two egg sacs with thousands of eggs per sac (Guarisco, 2010).

Because biologists have often believed that one or more resources, such as food or shelter, are in limited supply, this implied that species were constrained by competition. However, many studies that were designed to detect competition among spiders in the field, failed to do so (Wise, 1993).

Biogeographers, on the other hand, explore vicariant distributions in terms of plate tectonics, physical barriers, and a species' dispersal ability (Platnick, 1976). For example, the trapdoor spider genus *Cyclocosmia* occurs in the southeastern United States, Mexico and southeastern Asia. Since it has very limited dispersal abilities, its distribution is explained by the breakup and subsequent movement of pieces of the supercontinent of Pangaea (Gertsch & Platnick, 1975). Another mygalomorph genus, *Antrodiaetus* (Araneae: Antrodiaetidae), has a similar distribution (Coyle, 1971).

Spiders employ a unique method of dispersal called "ballooning" that enables many to travel near and far. During his monumental voyage on the H.M.S. Beagle, Darwin (1839) commented on the large number of ballooning spiders in the ship's sails even though they were over 200 miles from the nearest land. A systematic survey of aerial plankton was undertaken in the skies over Louisiana. Planes with plankton nets were flown at various heights above the ground, during the day and night, and in different seasons. The total catch after flying 88,827 miles over a five-year period was 28,739 invertebrates, of which 1,461 were spiders. However, only two gnaphosids were taken during this survey: a species of *Zelotes* and an undetermined member of the family (Glick, 1939). An aerial survey of ballooning spiders in eastern Texas yielded 17, 596 spiders, of which only 20 individuals belonged to the family Gnaphosidae (Dean & Sterling, 1985). Therefore, it appears that ballooning is very infrequently used as a dispersal mechanism by gnaphosids, including species of *Drassyllus*.

Discussion and Conclusions

Because most species of *Drassyllus* in Kansas are at the extreme edges of their ranges, detailed ecological studies of the Kansas populations should prove enlightening. Basic natural history information is sorely needed, such as: temperature, moisture, habitat and microhabitat requirements; fecundity, dispersal

Drassyllus lepidus male.

mechanisms, prey composition, and longevity. Future field work may even add a few more species of *Drassyllus* to the list, which currently consists of 16 species.

Acknowledgments

I thank Glenn Salsbury for donating the specimens of *D. frigidus*. A special thanks to Jennifer Haight for producing the range maps and critically reviewing the paper.

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Student Grant Recipient Reports

Below are reports from student recipients of the AAS Vincent Roth Fund for Systematics Research (VRF) grants and for Arachnological Research Fund (ARF) grants for 2021.

Alma Rosa Juárez Sánchez MS student affiliated with the Universidad Autónoma de Tlaxcala in Tlaxcala, México and the Instituto de Biologia, Universidad Nacional Autonoma de México (UNAM) received a VRF grant for her project, "Species complex *Loxosceles* "*colima*" Gertsch, 1958 (Araneae, Sicariidae): one species or several?" Alma's research focuses on the taxonomy of the *Loxosceles* "*colima*" species complex, the objective of this project is to implement an integrative taxonomic approach focused mainly on the different populations of this species complex to establish whether it is one or several species, using different evidences, morphological (genitalia characters) and molecular data (mitochondrial and nuclear markers). Nowadays, five new species of the *Loxosceles* "*colima*" species complex have been delimited, based on males and females from different species/populations of western Mexico. The money granted by the AAS was used for field work, payment for gasoline, toll booths, food and lodging. The project will be completed in February 2023. The sequences of two molecular markers of the new species are expected, used for the species delimitation analyses and their description.

Left, collecting simples in Santa María Chimalapas, Oaxaca, México; right, taxonomic review in the Colección Nacional de Arácnidos de México, UNAM.

Miguel Ángel García-García, PhD student from the Centro Interdisciplinario de Investigación para el Desarrollo Integral Regional Unidad Oaxaca received an ARF grant for his project, "Review of the *Anyphaena* Sundevall, 1833 species (Araneae: Anyphaenidae) from Mexico." Miguel's doctoral research is about the revision of the genus *Anyphaena* of Mexico, including taxonomy and systematics. Currently, he is in the taxonomic revision stage, which consists of collecting anyphaenid specimens in the field as well as searching for specimens in different biological collections in Mexico. The grant received by the AAS helped cover some expenses for the fieldwork in search of *Anyphaena* species in the Oaxaca state of Mexico. He was also able to visit several Mexican biological collections to search for specimens of Anyphaenidae, especially of *Anyphaena*, and to borrow them to study in detail. The Mexican biological collections. He expects to publish a scientific article in 2023 detailing the taxonomic revision of the genus *Anyphaena* and hopes to carry out a phylogenetic analysis of this taxon.

Aspiration on grapevine foliage on a farm with intensive inter-row management. Agustina Peralta and Bruno Alzugaray.

Agustina Peralta, undergraduate student at the National University of Cuyo, Argentina, received an ARF grant for her project, "Characterization of the vegetation dwelling spider fauna in vineyards with different inter-row management in Mendoza, Argentina." The aim of her project was to assess whether different inter-row management (considering tillage and vegetation cover) affects vegetation-dwelling spider communities in vineyards of Mendoza, Argentina. The study compared two farms, one has intensive inter-row management with tillage and the other maintains vegetation cover. Agustina is currently finishing the data analysis and writing the final report. Preliminary results indicate that significant differences were found in the composition of vegetation-dwelling spiders between the two farms. She hopes to present the final document next month. The ARF helped Support the purchase of a vacuum sampler (G-vac), a digital thermohygrometer for the characterization of the sites, and a digital camera for photographing spiders. Other supported costs included fuel travel expenses, supplies, and other field equipment.

Looking for *Phidippus* in Magdalena Island, Baja California.

Luis Carlos Hernández Salgado, PhD student at the Centro de Investigación Cientifica y Educación Superior de Ensenada (CICESE), received ARF funding for his project, "Biogeography and macroevolution of the genus *Phidippus* (Araneae, Salticidae)." The primary objective of his project is to identify the center of origin of the genus *Phidippus*, elucidate the timing and patterns of its diversification and radiation, and estimate the historical-biogeographical processes that shaped its current distribution. To do that, he needs to obtain all the species of *Phidippus* to extract the DNA and capture Ultraconserved elements (UCEs) to obtain genomic data for use in the phylogenetic and biogeographical analysis. Luis used the AAS grant for two research stays in Marshal Hedin´s Lab at San Diego State University. In 2021, they captured UCEs for 36 species of *Phidippus,* and this year they captured UCEs for 16 species. Luis is currently analyzing these data. The ARF funding was used to support his fieldwork in Baja, California, México.

Tan Kai Teck Desmond, Master of Philosophy student at Lingnan University, Hong Kong, received VRF funding to support his project, "Opiliones of Hong Kong." Tan's research focuses on the Opiliones of Hong Kong, a neglected taxonomic group in the region. He was attracted to these tiny creatures when one crawled slowly and rested on top of his hands while he was conducting fieldwork for other projects. The project is a starting point for hopefully many more Opiliones studies to come. It focuses on uncovering and describing as many species of harvestman in HK and the surrounding islands as possible since most research on this group dates back to half or even a century ago. The money granted by the AAS helped greatly in purchasing new equipment, such as a new microscope, usage fees for an electron microscope, as well as transportation to field sites and the purchase of capture boxes and equipment. Currently Tan is finalising a publication on the redescription of a laniatoid species *Heterobiantes geniculatus* and working on the reassignment of another *Gagrella sherriffsi*, a common Eupnoi species in HK. If all goes accordingly, the project should be completed in the year 2024. While it may be difficult to map out all of the Opiliones in HK, it is still exciting to be 're-discovering' these creatures for the first time in many years!

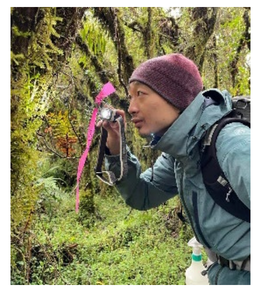
Alex Mauricio Cubas Rodríguez, undergraduate student at the National Autonomous University of Honduras (UNAH) received VRF funding for his project, "The family Sicariidae Keyserling, 1880 (Araneae) in Honduras." The main goal of Alex's research is to confirm the existence of any *Sicarius* Walckenaer, 1847, or *Loxosceles* Heineken & Lowe, 1832 in the Central American country. With the support of VRF he carried out sampling in several Honduran localities, mainly in Choluteca (Pespire) and Valle (Nacaome). The collecting was successful and he and his team found the first Honduran specimens of *Sicarius rugosus* (F. O. Pickard-Cambridge, 1899) and a few specimens of *Loxosceles* sp. The grant funding partially cover his research stay at the Butantan Institute in Brazil. He also collected other spiders during the field trips, and most are new records and several putative new species. He plans to finish the Sicariidae and sides projects the next year (mid-year), under the guidance of Dr. Antonio Brescovit and David Chamé.

Alex collecting.

Shubhankar examining the new species of *Scorpiops* under the microscope.

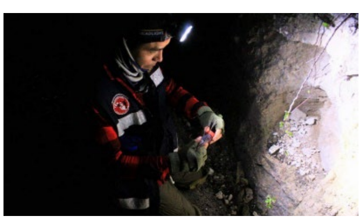
Shubhankar Deshpande, MS student at InSearch Environmental Solutions (IES), Pune, Maharashtra, India received ARF funding for his project, "Two new species of *Scorpiops* Peters, 1861 (Scorpiones: Scorpiopidae) from the Western Ghats with additional investigations into the constellation arrays and spermatophores." During their recent arachnological surveys in Peninsular India, he and his colleagues came across two new lithophilic populations of *Scorpiops* Peters, 1861. The status of the population was confirmed based on morphology and molecular data. Two maternally inherited genes *16S* and *COI* from the mitochondrial genome were amplified using Sanger sequencing techniques. Molecular phylogenetic trees were constructed using IQ tree and Mr Bayes v. 3.2.6 to check the ancestral relationships. Images of constellation arrays of all described species of *Scorpiops* except *S. pachmarichus* from Peninsular India were taken using field emission scanning electron microscopy (FESEM). The spermatophores were dissected and treated to study morphology. Based on the morphology, it's evident that the new species are cryptic but are genetically divergent from the congeners. The AAS grant was utilised for molecular work and FESEM imaging. The partial grant was utilised for fieldwork as well. Shubhankar expects to submit a manuscript based upon this research by January 2023.

Bradley Allendorfer, MS student at Eastern Michigan University, United States, received ARF funding for his project "Natal dispersal and activity of tarantula spiderlings (*Aphonopelma hentzi*)." At the Comanche National Grasslands in La Junta, Colorado, 160 tarantula burrows were identified and flagged in an attempt to document natal dispersal events of Texas Brown Tarantula (*Aphonopelma hentzi*) spiderlings. Over the month (mid-July through mid-August) that the project took place, tarantula spiderlings were unfortunately never seen, however; egg sacs were located in many of the burrows. Because spiderlings were not found this year, identifying factors that impact the timing of retreat in adult tarantulas became the primary focus of this season's field work. Quantifying the timing of retreat was completed by using GoPro time-lapse footage and daily real-time observations. This data was scored by visually assessing whether the tarantula was visible within the burrow or approximating its distance from the burrow, as well as noting when burrows were sealed with webbing (marking when activity ceased). Activity data will then be compared to environmental temperature data (collected both inside and outside the tarantula burrow), nearby vegetation, proximity to the nearest conspecific and the presence of an egg sac. Body condition will also be determined for females that we coaxed from their burrows to be weighed and measured. We will again compare females with egg sacs to those without. Grant funds were primarily used to purchase GoPros and tripods to be used to collect activity data as well as iButton temperature loggers used to collect environmental temperature information.



Yu-Heng collecting data in the field.

Yu-Heng Lin, PhD student at the University of British Columbia, Canada, received ARF funding for the project, "Web-building spider strategies to cope with damage from the rain along a gradient of precipitation intensity." Yu-Heng plans to investigate how intense rainfall impacts social and non-social spiders with different web architectures in terms of direct material damage and decreased prey capture rate. He carried out an observational study on the eastern slopes of the Ecuadorian Andes, at elevations where rains have been shown to range from intense (lowland tropical rainforest) to mild (higher elevation cloud forests). He conducted manipulative experiments at the highest rain intensity site, the Yasuní National Park. Yu-Heng collected web, prey capture, and rain data for both experiments. Web data includes characteristics of webs, microhabitat use, web damage, and recovery from rainfall events. He also used transparent sticky traps to measure insect availability in the respective microhabitats in periods with and without rain for the prey capture data. For the rain data, a HOBO Rain Gauge Data Logger RG3 was used to record hourly rain rate to represent the intensity of rainfall events. These data were also collected in the manipulative experiment. The only difference is this experiment involves webs that are (a) naturally occurring, (b) protected from rain by a tarp. Funding helped cover travel and accommodation costs.



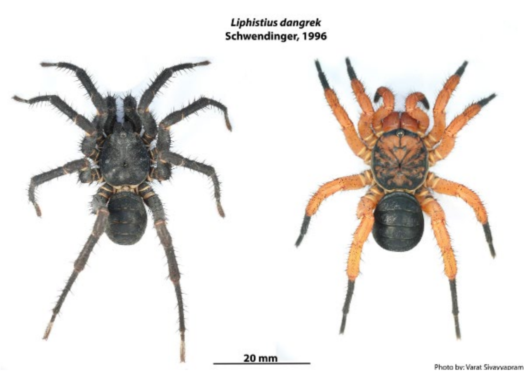
Samuel night collecting in the jungle.

Samuel Nolasco Garduño, PhD student at the Institute of Biology, Universidad Nacional Autónoma de México, Tlaxcala City, Mexico, received VRF funding for his project, "Evolution, diversification and lineage dating of the spider genus *Physocyclus* Simon, 1893 (Araneae: Pholcidae)." Samuel's research focuses on the study of spider genus *Physocyclus*, which is distributed mainly in Mexico. The objective of the project is establishing the phylogenetic relationship of this genus, using a dataset of morphological characters and a tandem of three molecular markers (genes CO1, ITS2 and 28S). He will analyze species delimitation testing different methods (barcoding, genetic distances, coalescence and analysis based in trees). To recognize the factors that contributed to the diversification of the group and know the divergence times, he will do analyses of lineage dating and reconstruction of ancestral areas. Funding supported transportation, lodging, and supply costs.

Rose Andrews, undergraduate student at Eastern Michigan University, United States, received ARF funding for her project, "Can dietary supplements result in color change? Accessory pigments (Carotenoids) and color change in tarantulas (*Psalmopoeus irminia*). Accessory pigments, specifically carotenoids, are found to be the building blocks of coloration in a variety of organisms. Spiders, similarly to other organisms such as birds and fish, cannot produce carotenoids de novo. When consumed, carotenoids have been shown to induce color changes in animals, including spiders. We hypothesized that through differential diets *P. irminia* would exhibit coloration changes. To test this, we created groups with a diet fed with 1) crickets fed a colorless starch diet or 2) crickets fed fish food containing increased levels of carotenoids. We monitored color levels by collecting the individual molts and imaging them using a Leica microscope, maintaining the same conditions for each image including non-LED lights. We then analyzed images through the program ImageJ, by selecting the metatarsal segment of the molt and generating histograms that show the amount of RGB, total color, and intensity of pixels per segment. We are continuing to collect and analyze molts. We are expecting this project to be completed by Summer 2023, and are working towards publishing a paper with the results. Grant funds from AAS were utilized to purchase all of the equipment necessary, including: *P. irminia* spiderlings, containers, crickets, substrate, and Petri dishes to give a sterile environment for storing molts. Funds were also utilized to attend the AAS meeting at UC Davis.

Varat Sivayyapram, PhD student at Chulalongkorn University, Thailand, received ARF funding for his project, "Preliminary survey on population demography of segmented spider genus *Liphistius* in Thailand." The segmented spider genus *Liphistius* has interested many arachnologists for a long time. *Liphistius* belongs to the most basal clade of spider phylogeny. These spiders are considered living fossils since they retain similar external morphology to their ancestors. Surprisingly, we have little knowledge about the life history of *Liphistius*. During my PhD dissertation, I surveyed all types localities of known species in Thailand and discovered nesting sites of several putative new species. Nearly all *Liphistius* tend to have very small ranges, with many species known from only a single locality. In this study, we aim to document several aspects of the biology of *Liphistius*, including growth rate, survivorship, and their annual cycle in their natural habitat. the goal of this project is for providing information that can be used to assess extinction risk and to construct conservation plans for *Liphistius*. The ARF grant has been used to support travel expenses for fieldwork. Currently, I revisited the nesting sites of several *Liphistius* species to select suitable nesting sites for studying their nesting biology. (>20 of adult females, not routinely visited by the public, and not at immediate risk of human-mediated destruction). We will decide on our study site and start our study by this November. For this project, we aim to document the annual cycle of *Liphistius* every month until November 2023. The longer time population monitoring will be conducted if possible.

Varat Sivayyapram, PhD student at Chulalongkorn University, Thailand, received VRF funding for his project, "Multilocus phylogeny of primitively segmented spiders, genus *Liphistius* (Mesothelae, Liphistiidae) in Thailand." The segmented spider genus *Liphistius* are highly morphologically conserved. All species share similar external morphology. Currently, only their genitalia can be used to identify them at the genus and species level. However, as with other spiders. The female genitalia usually show high intraspecific variation, while adult males are rare in nature. In addition, *Liphistius* classification and the interspecific relationships have never been tested using phylogenetic approaches. This project is a part of my dissertation on the taxonomy of the segmented spider genus *Liphistius* in Thailand. I used five nucleotide markers to reconstruct the phylogenetic relationships among species within the genus *Liphistius*. The VRF grant was used for supporting molecular reagents and DNA sequencing fees.



Liphistius dangrek. Dorsal habitus of male (left) and female (right).

Illuminated pitfall arrays used to attract and collect solifuges.

Goran Shikak, MS student at the University of Colorado, Denver and the Denver Museum of Nature & Science, United States, received ARF funding for his project, "Species Delimitation of the Chihuahuan *Eremobates palpisetulosus* species group through an integrative taxonomic approach." The *Eremobates palpisetulosus* species group is a paraphyletic group composed of several morphologically similar clades that diverged during the Miocene. Three of those are distributed allopatrically across the Great Plains and Chihuahuan desert. My research will fill in knowledge gaps concerning the evolutionary history of solifuges distributed across the Chihuahuan and Great Plains ecoregions. I am investigating Pleistocene refugia for the biogeographic clades based on current species distribution models. My research will be using current Species Distribution Models to test for overlap of species within an individual clade. Morphological characters are also being investigated to identify synapomorphies that may support the biogeographic clades. The last component will be producing a revised phylogeny using Next Generation Sequencing. The goal is to provide multiple lines of evidence that will deconstruct the paraphyletic species group and support smaller monophyletic species groups. The funding that was awarded to me by AAS allowed me to setup fieldwork needed to increase samples sizes for several taxa. The funding was used to fieldwork.

Cláudia Xavier, PhD student at Museu Paraense Emílio Goeldi (MPEG) and Universidade Federal do Pará (UFPA) in Belém, Brazil, received VRF funding for her project, "Phylogenetic analysis of the *Stethorrhagus* complex of genera (Araneae, Dionycha, Corinnidae, Corinninae)." The corinnids comprise a very diverse family, being the 15th with the highest number of described species worldwide, composed of 73 genera and 824 species. They are usually found in leaf litter and rotting trunks, and can also be found in other environments, under rock in the forests, ravines or in the trunks of living trees, for example, with a few synanthropic species. Among the genera of the subfamily Corinninae, there is a putatively monophyletic group constituted by the genera *Stethorrhagus* Simon, 1896, *Parachemmis* Chickering, 1937 and *Tupirinna*, Bonaldo, 2000, characterized by the presence of a pair of excavations on the anterior margin of the sternum and an articulated ventral apical process on the tibia of the male palps. Of the proposed spider phylogenies including the family Corinnidae, none involved any of the three genera mentioned above. The main goal of my doctoral thesis project is to propose a phylogenetic hypothesis between these genera and further new genera that may be recognized in the complex, as well as their respective species, based on morphological characters. Funds supported travel to various museums to examine type material.

Cláudia examining museum specimens.

Searching for spiders inside poorly known caverns of Southern Ecuador.

Pedro Peñaherrera-R., undergraduate student at the Universidad San Francisco de Quito, Ecuador, received VRF funding for his project "200 years after *Cyclosternum* (Mygalomorphae: Theraphosidae): new studies towards resolving the taxonomy of theraphosids in Ecuador." Most theraphosids known from Ecuador are poorly known, with most of them being described by naturalists at the end of the 1800s (e.g., Anton Ausserer and Eugène Simon). Ecuadorian theraphosids have been largely overlooked for centuries and their taxonomic status, ecology, distribution, or even simply a precise type locality, remain unknown. Of the genera and species described during the 1800s, *Cyclosternum schmardae* Ausserer, 1871, type species of *Cyclosternum* Ausserer, 1871, was described from a female from the unclear locality (translated from German) "Cordillera of Ecuador between 4000' and 5000'." Subsequently, 37 species have been described in *Cyclosternum*, but only 12 remain in the genus. In most cases, their type material was not compared with that of the type species of *Cyclosternum* and the descriptions are rather vague. The aim of this project consists of two critical stages to increase understanding of the genus *Cyclosternum* and other theraphosids, especially Ecuadorian species. (1) Collecting topotypic material following the steps of their original collectors; cartography of Ecuador when each species was described is also considered. Funds were used mainly for transport, lodging and food for the Ecuadorian team. Our preliminary results have shown us how highly diverse Ecuador is, not only in terms of theraphosines, but of the entire suborder Mygalomorphae, with more than 70 potentially new species found between 2021 and 2022 during fieldwork. This project helps to strengthen local capacities in mygalomorph taxonomy in Ecuador.

Fieldwork at 4000 m elev. in the India Himalayas.

Irina Das Sarkar, PhD student at the Wildlife Institute of India received ARF funding for her project, "Spiders of the Cold Deserts of Trans-Himalayas: A Case Study from Spiti Valley of India." Irina is working on spider community assemblages in the India Himalayas under the supervisions of Dr. V. P. Uniyal and Dr. Manju Siliwal from the Wildlife Institute of India. My work primarily focuses on elevational profiles of spider diversity with an emphasis on community assemblage patterns of new-world spiders (Araneomorphae) along a wide elevational gradient in the Indian Western- and- Trans-Himalayas. Our overarching goal is to understand species-environment relationships by integrating taxonomic and functional diversities to gain a comprehensive understanding of Himalayan spider communities. We also aim to identify range-restricted species/groups at higher risks of climate mediated impacts in vulnerable ecosystems. Arachnids of the Indian Himalayas are diverse, yet under-documented. The ARF grant greatly aided logistical and field support needed for work in the high-altitude regions of Spiti valley (3500-4500 masl). Findings from the project are in the process of being collated into the first trans-Himalayan spider database with details into community properties and feeding guild preferences across the gradient. The ARF grant offered novel opportunities to document spider diversity from a region previously unworked in, furthering arachnological research in the Indian Himalayas and opening exciting avenues to new records and possible range extensions.

Sphodros purseweb spider.

Blaise Sava, undergraduate student at The Pennsylvania State University, United States, received VRF funding for the project, "Employing Telemetry to Investigate the Natural History of a New Species of Purseweb Spider, Genus *Sphodros*." As part of my work with atypids, I am describing a new species of the genus *Sphodros* which was only known from male specimens collected in Pennsylvania. The funds were used to cover travel expenses and trapping materials during efforts to find a female. During three weeks of on-site field collection, over 180 live pitfall traps were placed. Surprisingly, only one male was ultimately recovered. Radio transmitters were affixed to the spider in hopes of tracking it to a female web. Unfortunately, the spider died shortly after being rereleased two days later. Subsequent visual searches, however, led to the discovery of a single female web. Pending confirmation via DNA barcoding, a full description of this new species can now be made. As this is part of my undergraduate honor's thesis work at Penn State, the results will be finalized within the next year.

Javier Blasco Aróstegui, PhD student at the University of Lisbon, Portugal, received VRF funding for his project, "Venom for Understanding Diversity and Evolution of European scorpions." The purpose of this project is to demonstrate the validity of venom MFPs as a complementary tool for recognition and differentiation of European scorpions' species and populations. Funding covered part of the fieldwork and travel expenses for the project.

Alex Salazar, PhD student at Miami University, United States, received ARF funding for his project, "Settling in at home: how long does an edge population remain an edge population." As a species expands its range, certain behaviors and life history traits may vary between the core population and the population along the leading edge; this is particularly relevant to invasive species as they go through their range expansion. *Pholcus manueli* (Araneae: Pholcidae), an invasive cellar spider, is expanding westward across the United States. I hypothesized that while certain traits, such as boldness, and higher fecundity and development, would be highly beneficial as *P. manueli* expand their range, these traits may not be as important in long established populations. Thus, we might see differences in these traits between the leading edge of the invasive range, and the core of the invasive range, near where *P. manueli* was first described in the 1930s. During the summer I attempted to characterize boldness through simple field assays where I probed spiders in their webs or blew puffs of air on them. Individuals were also collected to quantify differences in mating and life history patterns in the laboratory, which is ongoing. This was done along the leading edge of the invasive range, South Dakota, Nebraska, and Kansas, as well as the core of the invasive range, New Jersey and Maryland. Funding was used to help support my field work, including travel and housing expenses.

Dallas monitoring tarantulas.

Dallas Haselhuhn, MS student at Eastern Michigan University, United States, received ARF funding for his project, "Male emergence and timing of *Aphonopelma hentzi* during their mating season." Using funds from AAS, I was able to purchase temperature loggers that I have placed throughout a region of Southeastern Colorado to monitor temperature changes; both air, and ground. These temperatures play a key role in determining at what point males begin to emerge from their burrows to start their mating season. As the mating season begins to wrap up due to declining fall temperatures, my field season will be done sometime at the end of October. Analysis will begin soon after.